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NAVIGATING AIR FORCE POLICY AND PROCEDURES IN SUSTAINMENT OF  
COMMERCIAL DERIVATIVE AIRCRAFT

By

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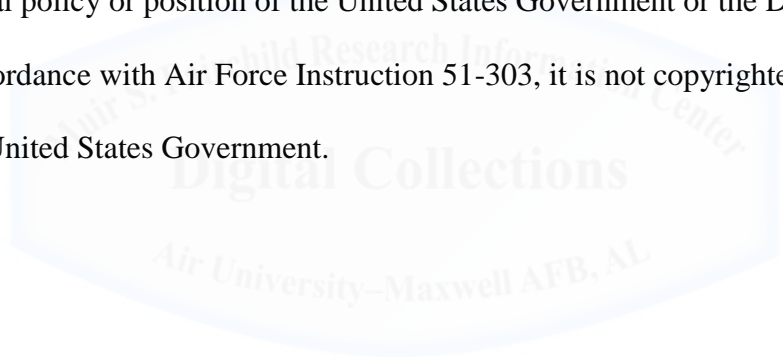
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## Preface

In October 2007 the Assistant Secretary of the Air Force issued a memorandum directing Oklahoma City Air Logistics Center (OC-ALC) to accomplish KC-10 paint workload organically beginning in FY08. Additionally, this same memorandum requested OC-ALC, among others, pursue Federal Aviation Administration (FAA) repair station certification. Thus began my indoctrination into the world of Commercial Derivative Aircraft (CDA) and Contract Logistics Support (CLS). At the time, I was the chief of the Center Quality Office charged with oversight of the Center's ISO certification. I silently questioned the sanity of my management for assigning the task of obtaining repair station certification to an office full of ISO quality inspectors. Nonetheless, with the help of a great team of personnel from across the Center, we accomplished the objective by obtaining Part 145 repair station certification. Fast forward to August 2009 when I was given a career broadening opportunity to reassign to the OC-ALC Contractor Logistics Support Division (OC-ALC/GKS) as chief of the Trainer Aircraft Section. Ironically, my section falls in the Tanker/Trainer Branch . . . the same branch where the KC-10 resides.

Two years after coming to CLS, I find myself asking the same questions I asked back in 2007 when our team delved into the possibility of repair station certification. Almost every question centers on Air Force policy and procedures in sustaining CDA. On an average of three days a week, I ask one of my employees the following question, "Why do we have to do it that way?" The answer is most generally, "Because that's what Operating Instruction X tells us to do." As a consequence, more often than not, CLS is driven to follow policy meant for organic sustainment and not contractor sustainment. My hope is that this paper will provide a roadmap

to navigating policy and procedures in place as of October 2011 and be a catalyst to make changes that help CLS personnel provide the greatest sustainment support to our users.

This paper is dedicated to the CLS and FAA personnel who patiently answered my endless questions. Specifically, I would like to thank Mr. Ray Albright who was my sounding board for keeping on task and to Mr. Chris Ziegler who was my mentor in navigating the world of Word. I would also like to thank my husband for your support and patience. I could not have completed this without you.



## **Abstract**

The purpose of this research was to address Air Force policies and procedures preventing the AF from taking full advantage of the benefits of Commercial Derivative Aircraft (CDA) and Contractor Logistics Support (CLS). The research was conducted using the problem/solution methodology. Analysis of three case studies was used with the intent to identify possible changes to Air Force policy, procedures and processes to enable maximization of the benefits of CLS of CDA and minimize or eliminate problems, obstacles and constraints encountered in the sustainment phase of CDA. The KC-10 Paint case study showed problems encountered when an unplanned change to the sustainment strategy of a weapon system is implemented during the sustainment phase. The T-1A case study showed a risk in maintaining OSS&E by combining the use of both contracted and civilian maintenance personnel utilizing AF maintenance technical manuals. The E-9 case study showed where staffing constraints encountered under CDA CLS staffing concepts have been exasperated by a 2009 policy change that shortened period of performance for service contracts. While conclusions reached in the research did not fully support the theory that Air Force policies and procedures are preventing the service from taking full advantage of CDA CLS, the research did show a need for some changes in relation to CDA CLS. Recommendations include: establishment of an Air Force office of CDA experts; definition of CDA requirements with establishment of a CDA CLS baseline; establishment of an equivalency agreement with the FAA; development of CDA CLS specific training; and establishment of core source selection teams for sustainment contracts.

## Introduction

Air Force policies and procedures prevent taking full advantage of the benefits of Commercial Derivative Aircraft (CDA) and Contractor Logistics Support (CLS). "CDA programs often experience difficulties when compliance with special government requirements is forced on to what are otherwise commercial products."<sup>1</sup> This statement was published in *Industry Perspective for the Commercial Derivative Aircraft Guidebook* by Dayton Aerospace, Inc. in 2010. Within the text, the statement pertains to requirements levied during procurement of CDA, but the statement also holds true during the sustainment phase of CLS weapon systems. The framework for CDA in the Department of Defense (DoD) includes the Pre-Systems Acquisition Phase where material solution analysis and technology development takes place; the Systems Acquisition Phase encompassing engineering/manufacturing development and production/deployment; and lastly, the Sustainment Phase. The Sustainment Phase of a weapon system includes all operational and logistical support needed to maintain the weapon system up to and including actions taken to retire the system from the DoD inventory.<sup>2</sup>

Many CDA in the Air Force inventory utilize CLS for sustainment. The types of support contracted to commercial companies include supply services, engineering services, maintenance services, technical data support, and any combination of the four. Within these service categories, there are many combinations of military, civilian and contractor staffing. It is no wonder that problems arise in sustainment when Air Force policies and procedures are often written with standardization in mind. CLS and organic sustainment concepts vastly differ from each other and cannot be managed under a one-size-fits-all concept.

The purpose of this research is to examine problems, obstacles and constraints encountered during the Sustainment Phase of CDA resulting from decisions made in the Pre-system Acquisition and Systems Acquisition phases as a result of Air Force policy and procedures. This research specifically addresses AF policies and procedures in relation to case studies within the Tanker/Trainer Branch to include the following:

- Tinker's journey to Part 145 repair station certification for KC-10 paint: What obstacle was met when the sustainment concept decided in acquisition was changed in sustainment?
- T-1A's acquisition and sustainment strategies: What problems have been encountered as a result of sustainment strategies decided in acquisition?
- Contracting practices for small CDA fleets like the E-9: what are the constraints of CLS on small programs?

These programs and questions are seemingly unrelated. What could KC-10 have in common with T-1s or T-1s have in common with the E-9? They are all commercial derivative aircraft sustained by contractor logistics support that have recently had to overcome Air Force policy and procedural issues in order to maintain uninterrupted sustainment services to the user. This research will conclude with proposed changes to Air Force policy, procedures and processes to enable maximization of the benefits of CLS of CDA and minimize or eliminate problems, obstacles and constraints encountered in the sustainment phase of CDA.



## **Background: Definitions, History and Requirements**

### **Definitions**

#### **Commercial Derivative Aircraft (CDA)**

As the term implies, CDA have a commercial counterpart. The commercial counterpart may or may not still be active in the commercial world. For example, the T-1A Jayhawk is a military version of the Beech 400A; the KC-10 is a modified (militarized) Boeing Company DC-10; and the E-9A is a military version of the Bombardier Dash 8, formerly Canadian DeHavilland.<sup>3</sup> In most cases involving CDA, some type of military specific modification has occurred. Other terms used to describe CDA are: military commercial derivative aircraft (MCDA); commercial derivative hybrid aircraft (CDHA); and commercial derivative transport aircraft (CDTA).<sup>4</sup> MCDA is a civil aircraft procured or acquired by the military; CDHA are CDA modified to meet military mission requirements and cannot transport passengers; and CDTA are CDA that can transport passengers.<sup>5</sup>

Other terms closely associated to CDA are *dual use* and *green* aircraft. Dual use aircraft have both civilian and military applications. Green aircraft is the part of a military aircraft that is common with the commercial version of the aircraft.<sup>6</sup>

#### **Organic Weapon Systems**

Aircraft with no commercial counterparts are generally aircraft/components procured for a specific military mission where a commercial counterpart either did not exist, or existed, but could not be modified to meet military specifications and requirements. These items are used exclusively for governmental purposes and are sustained organically – meaning no sustainment services are contracted to commercial companies. Because these weapon systems are maintained

organically, they are commonly referred to as *organic*. Maintenance, engineering services, supply services and data support is performed by military or civil service employees. These components, even when designed or produced by a commercial company, are not available for sale to the general public.

### **Contractor Logistics Support (CLS)**

The acronym CLS is used interchangeably as *commercial logistics support* and *contractor logistics support*. As the term implies, CLS uses commercial contractors to perform some or all of the components of sustainment to include aircraft maintenance, engineering services, supply support, and technical order (T.O.)/data services. Not all CDA use CLS, but all aircraft managed by the CLS Division at Tinker AFB are CDA.

The CLS Division (OC-ALC/GKS) at Tinker AFB is a system program office (SPO) for CLS. Organic and CLS system program offices at OC-ALC are charged with providing program management for their assigned weapon system during the sustainment phase. The difference between organic and CLS SPOs is vast. An organic SPO, such as KC-135 SPO, is comprised of all the program managers, engineers, equipment specialists, and technical order/data specialists needed to maintain that weapon systems. There are ~165 employees assigned to the KC-135 SPO at Tinker. Organic SPOs manage weapon systems exclusively using Air Force technical orders and processes.

Conversely, the CLS SPO at Tinker manages 26 different weapon systems<sup>7</sup> utilizing a variety of contracted services. As of Jan 2011, 55 contracts with a total value in excess of 14 billion dollars<sup>8</sup> were in place to enable sustainment of the 26 weapon systems managed by OC-ALC/GKS. The KC-10 SPO is located within CLS. A staffing comparison between KC-10 SPO and the KC-135 SPO can be made because the aircraft have similar missions. The KC-10

SPO has less than 40 personnel assigned, where the KC-135 SPO has ~165. Similar to the KC-135 SPO, the KC-10 SPO has program managers, engineers, equipment specialists, logistic management specialists, and technical order/data specialists assigned. Per AFD 62-6, "When a military mission is compatible with a certified civil usage, the AF will utilize [Federal Aviation Administration] FAA type certified commercial derivative aircraft (CDA) to the maximum extent practical."<sup>9</sup> The difference in staffing between organic and CLS SPOs is a result of the CLS SPO's ability to leverage FAA processes through contractual agreements. Regardless, this requirement drives CLS personnel to be subject matter experts of not only AF requirements, but also FAA requirements. The lack of understanding of the integration of AF and FAA sustainment requirements, in one way or another, is often the basis for problems, obstacles and constraints in relation to the sustainment of CDA.

## History

The concept for CDA has been around since aviation history began. The Wright Brothers signed a contract with the U.S. Government in February 1908. This contract was the result of a Request for Proposal (RFP) issued by the Army to procure an aircraft that could land and takeoff quickly, carry two people, and fly at 40 miles per hour. The Wrights won the contract by being the only contractor to meet the government's specifications and the first aircraft was delivered in the summer of 1908. Acceptance testing completed in the summer of 1909. The Wrights were given a performance bonus of \$5000 because their plane exceeded the government's specifications for flight speed by 2.5 mph. "The plane was formally accepted on August 2, 1909 and was designated Signal Corps Airplane No. 1"<sup>10</sup>.

The story of the acquisition of the Wright Brothers aircraft by the Army is simplistic, but to some extent still represents the Air Force acquisition process. The Air Force still identifies requirements, issues RFPs, selects a contractor through a source selection process, completes acceptance testing, places the acquired components into service, and sustains the component throughout its life cycle. In contrast, the difference in considerations to be analyzed during the acquisition process 100 years later has increased immensely. In 1909, Signal Corps Airplane was the only aircraft in the military inventory and it was considered a *green* aircraft. The commercial and military version of the aircraft was identical.

From the purchase of the first CDA in 1909 to the 1950s, the relationship between the aviation community and the U.S. military took on a new complexion. Aircraft design and capability matured vastly, but outside bombers and fighters, a commercial aircraft used in civil aviation was the exact same aircraft used by the military. This changed during WWII when innovative military thinkers saw the potential to increase use of military aviation practices beyond fighters and bombers. Aircraft were needed specifically for transport use, but the existing commercial aircraft did not meet military needs. "As an example, one of the first military unique transports was the Fairchild C-82 developed soon after WWII. It had clam shell doors for easy loading and unloading on unimproved fields and runway"<sup>11</sup>. During this era, the U.S. had the time and the resources to invest in military unique aircraft. While the military continued to use CDA for training, VIP transportation, and utility missions, there was a distinct line drawn between commercial and military aircraft. The line being drawn during this era did not just apply to civilian and military aircraft capabilities and design, but was also being drawn between laws and regulations governing the use of civil and military aircraft.

## Requirements

"The Air Commerce Act of 1926 created the predecessor of the Federal Aviation Administration and the Aircraft Certification Service. This Act represented the first Federal regulation of civil aircraft, airmen, and manufacturers. The Federal Aviation Act of 1958 brought the FAA into the modern era."<sup>12</sup> The Federal Aviation Act of 1958 changed into Title 49 (Transportation) of the United States Code as a result of Public Law 103-272, enacted 5 July 1994. The Federal Aviation Act of 1958, and subsequently Title 49, was put in place to govern all components of *civil aviation* safety to include design, materials, workmanship, construction, and performance in civil applications. The oversight and governance of Title 49 fell to The Department of Transportation. No authority was given to the Department of Transportation for oversight of Department of Defense aviation programs. The services under the Department of Defense were not then, nor are they today, held to aircraft and aircraft component FAA certification standards implemented as a result of Title 49. Because the Department of Transportation has no authority over Department of Defense aviation programs does not mean the Department of Defense does not follow any airworthiness and certification procedures, it only means they are governed separately. Each of the services has regulations governing airworthiness. Some examples are AFI 62-601, *USAF Airworthiness*; NAVAIRINST 13100.15, *Engineering Technical Review of New CDA Aircraft Acquisition or Major Modification Programs*; and Army Regulation 70-62, *Airworthiness Qualification of Aircraft Systems*. All of these airworthiness standards, both civil and military, provide guidance to ensure a common goal of providing a safe, secure and efficient aviation system. They all contain independent review and approval processes to ensure the common goal is reached. Following independent review and approval processes for CDA has proven to be duplicative, expensive and time consuming.

On 29 Jun 1994, then Secretary of Defense William J. Perry issued a policy memorandum on MILSPEC (military specifications) and MILSTD (military standard) reform.<sup>13</sup> The subject of the policy memorandum was *Specifications & Standards – A New Way of Doing Business*. In his memorandum Secretary Perry stated, "Integration of commercial and military development and manufacturing facilitates the development of dual-use processes and products and contributes to an expanded industrial base that is capable of meeting defense needs at lower costs."<sup>14</sup> The memorandum directed the Undersecretary of Defense (Acquisition and Technology) to implement policy changes in military specifications and standards, contract management, program use of specifications and standards, and the tier system of specification and standards. The premise of the memorandum and its directed policy changes were to take advantage of commercial policy and practices in place for airworthiness by avoiding government unique requirements and migrating to use of commercial practices when practicable.

The Perry policy's intent was directed to the Air Force via Air Force Policy Directive (AFPD) 62-4, *Standards of Airworthiness for Passenger Carrying Commercial Derivative Transport Aircraft*, and AFPD 62-5, *Standards of Airworthiness for Commercial Derivative Hybrid Aircraft*. The two policy directives were later combined and reissued as AFPD 62-6, *USAF Airworthiness*. AFI 62-601, *USAF Airworthiness*, implements the directives within AFPD 62-6. This policy directive states, "When a military mission is compatible with a certified civil usage, the AF will utilize FAA type certified commercial derivative aircraft (CDA) to the maximum extent practicable."<sup>15</sup> It further states, "The Air Force may accept and use FAA evaluations and inspections for CDA."<sup>16</sup>

Sound economic principles are supported for the procurement and production phases for the government's purchase of CDA. Non-recurring research and development costs must be

"budgeted upfront and totally charged to [a] single program"<sup>17</sup> in the military. Commercial companies have the luxury of using "proven and production ready technologies" and spreading their "non-recurring cost over a rather large fleet of aircraft that are sold to multiple users."<sup>18</sup> Additionally, the military incurs cost-avoidance savings by purchasing CDA since the military does not have to invest in production costs such as a production facility, tooling, personnel, training, etc.<sup>19</sup> Savings are harder to quantify once a CDA enters sustainment phase.

As stated previously, there is a plethora of sustainment options for CDA. Supporting a business case analysis for sustainment requires the ability to predict the future, or at worse case, make a really good guess. One choice, among many, is whether the platform will be maintained organically or via CLS. A 2009 RAND study cited several reasons existing CDA platforms use CLS.<sup>20</sup> Two of the reasons include availability of commercial contractors to support the aircraft and fleet size. The first reason, availability of commercial contractors, appears justifiable as long as the commercial counterpart to the MCDA is active. As long as the commercial counterpart to the MCDA is active in the civil aviation world, engineering expertise, mechanical expertise, etc. will provide a built-in support system for the military to leverage. The second reason, fleet size, is questionable. The theory is that supporting a small fleet of aircraft organically would not provide a return on investment to the government. For example, the total of the E-9A fleet is two. Providing facilities to maintain the two E-9A aircraft is not an issue, they are maintained in a government hanger at Tyndall AFB. But personnel training and stability of the workforce would be an issue if the platform was maintained organically. The E-9A is equipped with specialized mission systems unique to the two aircraft. It would not be beneficial to the government to invest in training personnel in special systems maintenance when those skills would not be transferable to any other aircraft in the Air Force inventory. Without crunching

many numbers, it is easy to come to the conclusion that CLS is cost effective for small CDA fleets. Regardless, there is a disparity between fleet sizes across the CLS division at Tinker AFB that indicates fleet size is not a factor. While it is true the majority of the fleet sizes are less than 15, the T-1A has 178 aircraft in its fleet.

The RAND study<sup>21</sup> found the decision between organic or CLS is influenced by the acquisition culture of the time. "In the 1980s . . . the default source of repair was organic" and "In the 1990s, the Air Force chose CLS for programs that would have had organic support in the past."<sup>22</sup> In addition to cultural influences, another cyclical factor weighing heavily on the decision between organic or contracted support is compliance requirements with 50-50 and core requirement laws. Title 10 §2060, §2464, §2466 and §2474 govern these requirements. Title 10 §2460, *Definition of depot-level maintenance and repair*, defines depot-level maintenance; §2464, *Core logistics capabilities*, defines the DoD's responsibilities to maintain core functions to ensure effective and timely response to national defense situations; §2466, *Limitations on the performance of depot-level maintenance of material*, defines 50/50 requirements; and §2474, *Centers of Industrial and Technical Excellence*, establishes requirements for "Centers of Industrial and Technical Excellence" and their maximum utilization. The sections of Title 10 noted above are integral to the case analyses in the next *Obstacles, Problems and Constraints* Section. The applicability of these sections of Title 10 will be discussed in each case analysis.

The combination of Title 10 requirements, FAA requirements, and various AF policy and procedures governing implementation of those requirements have led to multiple problems, obstacles and constraints that are common across all CLS platforms. Analysis of the problems, obstacles and constraints is provided in the following case studies.



## Obstacles, Problems and Constraints

### KC-10 Paint

On 5 February 2007, the office of the Secretary of the Air Force issued a memorandum titled, *Air Force 50/50 Review Team Results*. This memorandum directed, and redirected, workload assignments of several weapon systems. Among those weapons systems listed, was the KC-10 paint workload. The memorandum stated, "The [50/50] team briefed the Secretary of the Air Force (SAF) on the results of the review and obtained approval for the following: . . . (d) KC-10 Paint: Accomplish paint workload at OC-ALC beginning FY08."<sup>23</sup> In a separate paragraph of the same memorandum, SAF *requested*, not directed, the Air Logistics Centers (ALC) ". . . pursue . . . FAA-certified repair facilities at our logistics centers to posture for commercial/commercial derivative repair."<sup>24</sup>

SAF's direction to perform KC-10 paint at OC-ALC with only a recommendation to pursue FAA-certified repair station certification was in disagreement. In fact, KC-10 paint could not be performed at OC-ALC as organic workload without FAA certification because of decisions made in the acquisition phase of the weapon system. When the KC-10 was procured by AFMC, the decision was made to sustain full CLS. Meaning maintenance, engineering services and supply services were performed via contracted support. The maintenance contractor at the time of SAF direction was Boeing. Among other maintenance to be performed on the aircraft, Boeing was under contract with USG to paint the KC-10. Another clause in the USG contract with Boeing obligated Boeing to perform all maintenance in accordance with FAA procedures and for Boeing to be FAA certified. FAA certification procedures require

maintenance be performed in an FAA certificated Part 145 repair station. This is a common clause in all maintenance contracts for CDA following the CLS concept.

By requiring contractors to be FAA certified, the Air Force leverages (and accepts) FAA procedures as meeting AF requirements for sustainment of CDA. It is important to note at this time that the reverse concept does not apply. Meaning, AF policies and procedures are not recognized as equivalent to FAA certification procedures by the FAA. In fact, painting the KC-10 organically at OC-ALC, as directed by SAF, violated the Air Force's own contractual agreement with Boeing because the AF basically became a sub-contractor to Boeing who had contractual ownership of the maintenance processes. Boeing was contractually required by the AF to be FAA certified and FAA certification procedures required all sub-contractors to also be FAA certified to meet FAA Part 145 requirements. The paint process was not negotiated out of the Boeing contract, so Boeing was still contractually obligated to ensure airworthiness for the aircraft. If OC-ALC had not obtained FAA repair station certification, painted the aircraft and returned it to Boeing, Boeing would have been in violation of FAA Part 145 Repair Station policies. In other words, Boeing would have been at risk to lose their Part 145 certificate if they had signed off the return to service documents after OC-ALC (basically a sub-contractor to Boeing in this scenario) had painted the aircraft. OC-ALC had to be FAA certified before KC-10s could be painted in OC-ALC facilities. Therefore, SAF's direction to pursue FAA certification had to happen before painting could begin. SAF's memorandum implied these were independent variables, and they were not. This demonstrated a lack of understanding by SAF of the intricacies of CLS's requirement to follow dual processes (meeting both FAA and USAF requirements).

Since no other Air Force organization had obtained FAA certification, an integrated process team was convened to undertake the endeavor. The application process was followed as outlined on the FAA's public webpage. The first step taken was to submit a pre-application statement of intent (PASI) to the local Flight Standards District Office (FSDO). The PASI was submitted to the FSDO following the same procedures required of any non-government entity seeking repair station certification. The next step was to produce all documents required to be submitted with the formal application for certification. The PASI was submitted to FSDO 26 Mar 07 followed by submission of the formal application along with all required documents on 13 Jun 07.

The first of the last two steps required to obtain certification was passing a FSDO inspection (desktop audit) of all required documents. Once FSDO approved all applicable documents, all that remained was an on-site audit. At this time, the process began to unravel. The Oklahoma FSDO office reports to a regional administration office in Ft Worth, TX. The regional office, in turn, reports to the Flight Standards Policy office in Washington, D.C. The Washington office directed the regional and local FSDO offices to cease processing of the application citing regulatory guidance. As stated earlier, the FAA was established to provide over site to *civil* aviation. It was not in the FAA's charter to provide over site to an USG; therefore, FAA administrators viewed use of FAA resources to certify a USG facility as misappropriation of funds.

Members of the IPT team sought to resolve the issue through a memorandum of agreement with the FAA. Some team members met with FAA senior leaders in Washington in Oct 07. While the draft MOA was not signed at the Oct 07 meeting, a verbal agreement was made for the ALC to pay for all labor incurred by the FAA in processing the ALC's application

and for all on-site inspections. The ALC, specifically 76 MXW, was issued a Part 145 repair station certificate on 19 Dec 07 and were authorized to paint the KC-10 aircraft.

At this point, it would seem all was well. OC-ALC had met SAF's objectives outlined in the 5 February memorandum by obtaining repair station certification and accomplishing KC-10 painting; Boeing was cleared from any contractual issues since the sub-contractor (now the USG) was in compliance with FAA requirements; and the FAA was being paid for their services and would therefore pass scrutiny on appropriate use of taxpayer dollars. But all was not well.

Once word got out across the Department of Defense (DoD) that OC-ALC had successfully gained repair station certification, other services saw this as the answer to their similar issues in sustainment of CDA. Other Depots from all Services made inquiries to their local FSDOs citing OC-ALC's success in navigating the process. This prompted the FAA to issue a memorandum calling for a moratorium on repair station certification of any USG facilities where only USG assets are repaired until an MOA is signed between the DoD and the DoT/FAA. The reason given for this decision was, "We [FAA] determined this practice might be an inappropriate use of FAA aviation safety inspector resources" and the practice would not proceed further until "a memorandum of agreement for reimbursable expenses is signed by the military."<sup>25</sup> An MOA has still not been signed. OC-ALC still maintains their repair station certificate because they have remained in compliance with FAA regulations, but the FAA will not amend the certification to include any additional capabilities.

In summary, SAF directed OC-ALC to paint the KC-10 organically to bring the Air Force into 50/50 compliance as outlined in Title 10 §2466 which states, "Not more than 50 percent of the funds made available in a fiscal year to a military department . . . for depot-level maintenance and repair workload may be used to contract for the performance by non-Federal

Government personnel of such workload."<sup>26</sup> Painting of the KC-10 is defined as depot-level maintenance under Title 10 §2460 which states, ". . . the term 'depot-level maintenance and repair' means material maintenance or repair requiring the overhaul, upgrading, or rebuilding of parts, assemblies, or subassemblies . . . regardless of the source of funds for the maintenance or repair or the location at which the maintenance or repair is performed."<sup>27</sup>

Because Boeing was contractually obligated by the AF to be FAA certified, they could not subcontract any portion of the KC-10 maintenance (even if it was accomplished by the government) without violating their contract. This drove the AF to seek, and eventually obtain, Part 145 repair station certification. In a memorandum dated 3 July 2007, the FAA made the following observation: "The United States Air Force has applied to the Federal Aviation Administration (FAA) for a repair station certificate at Tinker AFB in order to paint Air Force KC-10 aircraft. Since these aircraft do not hold airworthiness certificates issued by the FAA, there is no regulatory requirement for these aircraft to be maintained/painted by an FAA certificated repair station; therefore FAA certification is not necessary."<sup>28</sup>

The Air Force has come full circle in this process as a result of its own policies and procedures. The purpose of sustaining CDA using a CLS concept is to levy FAA processes and procedures to remove waste from the process and take advantage of advancement of commercial technologies and commercial parts pools. Unfortunately, once the decision is made to sustain CDA via CLS and contractual agreements are made, changing the sustainment concept in execution year is near impossible. There are alternatives to full CLS that provides the USG more flexibility during sustainment, but those options are not without their own unique issues, as demonstrated in the following case study of T-1A sustainment.

## **T-1A Sustainment**

The T-1A is an example of using a combination of both FAA and Air Force sustainment concepts. The T-1A does not follow a full CLS sustainment concept. This decision was made during acquisition. As the SPO for the T-1A, the Contractor Logistics Support Division (OC-ALC/GKS) oversees execution of the Contractor Operated & Maintained Base Supply (COMBS) and the engineering services contract. The user of the T-1A is AETC, Air Education and Training Command. AETC maintains control of the maintenance process during sustainment. Within the maintenance portion of sustainment, AETC uses a combination of civilian and contractor maintenance. Civilians perform maintenance at three of the five T-1A bases and contractors perform maintenance at the other two bases. In this situation, the AF is not required to be a Part 145 repair station because the contractor is not obligated to be FAA certified at the two bases where the contractor is performing maintenance. In fact, the contractor has been contractually obligated to follow AF maintenance practices as outlined in AFI 21-101, *Aircraft and Equipment Maintenance Management*. In accordance with AF policy, AF maintenance is accomplished in accordance with AF technical orders (T.O.). Since the T-1A is a commercial derivative of the Beech 400A, all Beech 400A maintenance manuals had to be converted to AF T.O.s which must be kept current by the SPO. This, in itself, is not a problem; but, there is more labor required on the part of the Air Force. Under a repair station certification, maintainers are required to perform maintenance by using the original equipment manufacturer (OEM) manuals; therefore there would be no program cost for publishing and maintaining the platform's technical data. While the maintenance of the aircraft is accomplished via AF policies and procedures, supply and engineering support are not.

The COMBS contractor and the engineering services contractor are held to FAA regulations in the sustainment concept. COMBS controls all parts issued for maintenance and is required to issue FAA certified parts. The engineering services contractor happens to be the OEM. This relationship is contractually maintained because the government did not purchase the data rights for the T-1A aircraft. This means the Air Force must go through the OEM for all engineering changes to the aircraft. As the OEM, it is also incumbent upon them, to notify the Air Force of any airworthiness directives (AD) or airworthiness bulletins (AB) issued against the aircraft. The FAA issues ADs and ABs as a result of safety investigations and required self-reporting of issues by FAA certified OEMs and users of the commercial aircraft. Mandatory compliance to ADs is required by FAA certified facilities, but the AF has a choice. All ADs are reviewed and analyzed by the SPO engineering office to determine applicability to the military CDA. ADs are almost always incorporated because they are generally safety related, but there are exceptions that can be made because the FAA has no authority over military aircraft.

The sustainment concept of combining AF and FAA policies and procedures looks successful on the surface, but has proven problematic in some instances. One problem is maintaining operational safety, suitability and effectiveness (OSS&E) of the aircraft. The Defense Contract Management Agency (DCMA) provides oversight of maintenance performed by contractors even if they are working in accordance with AF policies and procedures. AF quality inspectors have oversight of civil service maintainers. While contractual requirements drive FAA certification of contracted maintainers, the AF must ensure oversight is accomplished because the FAA has no authority to inspect AF facilities. Again, DCMA is used as a vehicle for oversight of these contracts and largely there are no issues. Regardless, there are some differences in maintenance concepts adhered to by AF civilians and those followed by FAA

certified mechanics. DCMA cannot enforce AF policy on contracted personnel if those policies are not explicitly documented in the contract. This adds risk that contractors will follow FAA procedures in lieu of AF procedures and jeopardize OSS&E of the aircraft.

The T-1A example proves there are alternatives available for sustainment of CDA that allows for flexibility, but those alternatives are not without their own issues. When oversight is split between FAA and the AF, there is added risk. The SPO must be diligent in ensuring both FAA and AF regulations are followed and documented. Unfortunately, as previously noted in the *Contractor Logistics Support* section, staffing of a SPO is minimal in comparison to an organically maintained weapon system. The T-1A SPO consists of one program manager, one logistician, one funds manager, one equipment specialist, three engineers and one matrixed contracting officer. It is assumed that CLS weapon systems are leveraging FAA policies and procedures; therefore, increased staffing is not required. This assumption for the most part is true, but proves problematic in maintaining experienced personnel. CLS employees must be well versed in both FAA and AF sustainment procedures and the nuances in combining them.

In summary, no proof of problems was found in the sustainment concept of combining FAA and AF procedures. While problems with this sustainment concept are not a quantifiably documented issue, it does shed light on an ambiguous statement in AF policy. As of October 2011, AFRD 62-6 states, "When a military mission is compatible with a certified civil usage, the AF will utilize FAA type certified commercial derivative aircraft (CDA) to the maximum extent practical."<sup>29</sup> The determination of *maximum extent practical* appears to be up to interpretation. There is no question the T-1A mission is compatible with certified civil usage as there has been miniscule militarization modification to this aircraft. An attempt was made to gain access to T-1A acquisition documents to determine the source selection team's reasoning used in determining the



sustainment concept developed in acquisition, but those records were not releasable. While not a problem, risk of providing oversight and maintaining the expertise of the personnel to provide the oversight is noted as a concern. In addition to the identified risks, it is important to note that the sustainment concept is drafted during initial acquisition; therefore, it is imperative acquisition teams be well educated on both FAA and AF policies and procedures. This will enable the acquisition teams to provide a good foundation for sustainment concepts that must be adhered to during the entire life cycle of the aircraft. The importance of a well-educated source selection team cannot be over stressed. While not an initial acquisition, a recent source selection for an E-9 on-going CLS sustainment contract identified the need for placement of personnel educated and experienced in FAA and AF maintenance procedures on source selection teams. The analysis of the E-9 source selection also demonstrates how recently updated AF acquisition policies have constrained CLS.

## **E-9 Source Selection**

The recently concluded source selection for full CLS of the E-9 emphasized several ongoing constraints with AF policies and the CLS concept for CDA. One of the issues was in relation to ensuring experienced staffing during source selections. A second issue is related to the staffing issue, but centers on the frequency source selections must be held because of new acquisition rules. The third issue, unrelated to the first two, revolves around duplication of procedures/processes that deviate from the CLS concept for CDA.

Source selection staffing and frequency of occurrence for source selections are two constraints interrelated to each other. As discussed in the *Contractor Logistics Support* section of this paper, there are differences in staffing between organic and CLS SPOs. It is true that CLS

SPOs do not need the same level of staffing as organic SPOs. This is because a variety of services are contracted out, hence the term CLS. On smaller platforms, like the E-9, staffing is shared with other platforms. For example, the SPO personnel for the E-9 are the same personnel responsible for the USAFA (United States Air Force Academy) fleet – they are a shared resource. USAFA's portfolio consists of ~22 aircraft of multiple types, both powered flight and gliders.<sup>30</sup> There are only 2 E-9s in inventory. Both programs are different from the T-1A in that they are full CLS. There is 1 program manager, 1 equipment specialist, 1 logistics management specialist, 1 funds manager, 1 flight manual manager, 1 contracting officer and 3 engineers assigned to work both the E-9 and USAFA platforms. On any scale, this is minimal staffing. Providing adequate program management expertise while concurrently staffing a source selection with subject matter experts proves impossible. Staffing source selection teams is an inherent way of doing business in CLS. All programs must staff a source selection team to re-compete contracts well in advance of the contract's expiration date. A typical source selection, from initial meetings to drafting the request for proposal (RFP) to contract award takes approximately one year.

A source selection team is made up of a performance confidence assessment group (PCAG) and a technical team. The PCAG team assesses contractor past performance to determine relevancy to work proposed on the contract up for bid. The technical team assesses the contractor's ability to perform the work on the contract up for bid based on the contractor's proposal. As a whole, the team is responsible for awarding the contract to the bidder who is best qualified and provides best value to the government. It is crucial that the source selection team be comprised of personnel who are experienced in the source selection process, but are also subject matter experts in program specific requirements. While there is no set rule, typically a

PCAG team and the technical team will each have four members. There must also be one contracting officer on the team bringing the team total to nine personnel. Staffing source selection teams has always been an issue in CLS due to inherent minimal staffing at the program level, but recent changes to AF policy has exasperated the problem.

On 9 February 2009, HQ AFMC/PK issued a policy memorandum<sup>31</sup> providing new guidelines for periods of performance for service contracts. Previous to issuance of this memorandum, the majority of the service contracts had periods of performance of ~ten years. Although the memorandum provided a process to seek exception, it drove the limitation for period of performance on all service contracts to three to five years. The memorandum stated the "shorter terms [would] facilitate competition, enhance the possibility for small business participation, and ensure the government has access to the best providers and latest technology and ideas . . ."<sup>32</sup> What the memorandum failed to address was the burden passed to the already minimally staffed CLS organizations. In one day, this policy memorandum effectively doubled the number of source selections held in any one year – source selections the SPO was already struggling to staff adequately with experienced SMEs.

A third issue identified during the E-9 source selection process is unrelated to contract periods and staffing, but shows duplication of processes as a result of an AF policy and warrants mention as part of the E-9 source selection analysis. AFMETCAL, Air Force Metrology and Calibration Program Office, personnel contacted CLS personnel via email in September 2009 regarding information contained in the E-9 solicitation for bids posted on FedBizOpps. The solicitation addressed calibration of test, measurement and diagnostic equipment (TMDE) to be used during sustainment. In compliance with AF policy to "utilize FAA type certified commercial derivative aircraft (CDA) to the maximum extent practicable,"<sup>33</sup> the source selection

team designated the contractor as responsible for calibration of TMDE. AFMETCAL took exception to this requirement. AFMETCAL considered CLS platforms in general and E-9 specifically in violation of AF policy. AFMETCAL cited a previous memorandum sent to CLS in May 2009 quoting AFI 63-101, *Acquisition and Sustainment Life Cycle Management*, paragraph 3.94.8, stating: "The PM shall obtain the AFMETCAL PGM approval prior to contracting for commercial calibration services or when deviating from currently established calibration support plans..."

There were multiple discussions between CLS management and AFMETCAL, and eventually a mutually agreed upon resolution was reached in the rewording of the E-9 SOW to require all equipment, contractor or government furnished equipment, to be calibrated by AF laboratories. Any equipment furnished by the contractor for use on the E-9 that was also used by the contractor on other aircraft would not require calibration in AF laboratories and could be calibrated IAW FAA policy. The details of the resolution are not as important as the demonstration of a lack of recognition of the meaning of leveraging FAA policies and procedures within the Air Force. This fundamental disconnect is addressed in the following *Recommendations and Conclusion* section.

## **Recommendations and Conclusion**

The purpose of this research was to address Air Force policies and procedures preventing the AF from taking full advantage of the benefits of Commercial Derivative Aircraft (CDA) and Contractor Logistics Support (CLS). Analysis of three case studies was used with the intent to identify possible changes to Air Force policy, procedures and processes to enable maximization of the benefits of CLS of CDA and minimize or eliminate problems, obstacles and constraints encountered in the sustainment phase of CDA. The KC-10 Paint case study showed problems

encountered when an unplanned change to the sustainment strategy of a weapon system is implemented during the sustainment phase. The T-1A case study showed a risk in maintaining OSS&E by combining the use of both contracted and civilian maintenance personnel utilizing AF maintenance technical manuals. The E-9 case study showed where staffing constraints encountered under CDA CLS staffing concepts have been exasperated by a 2009 policy change that shortened period of performance for service contracts.

The case analyses themselves failed to demonstrate AF is not taking full advantage of benefits of CDA and CLS, but they did demonstrate a lack of understanding across the AF of the effects policy changes have on the CLS community. Therefore, the following recommendations are submitted in an effort to correct the lack of cohesiveness between isolated departments implementing change for Air Force policies and procedures in relation to CDA CLS.

## **Recommendations**

**Establish an Air Force Office of CDA Experts.** This office should be a clearing house for establishing new policies and approving policy changes that affect CDA platforms. One concurrent theme in the case studies was decisions made in a vacuum. SAF gave direction for OC-ALC to paint the KC-10 and all ALCs to pursue FAA certification without realizing the contractual implications and the (so far) unbridgeable gap between Air Force and FAA policies. HQ AFMC/PK did not provide a plan to answer the need for increased source selection staffing when it pushed policy shortening contractor performance periods. In not recognizing FAA procedures for TMDE calibration, AFMETCAL drove duplication of effort.

**Define the Requirement & Establish a Baseline.** Research did not reveal an Air Force baseline for determining sustainment strategy for CDA. The T-1A is partial CLS. The E-9 and

the USAFA programs are full CLS. There are benefits and detriments to both strategies. The AF needs develop a strategic plan for acquisition and sustainment of CDA. A decision matrix should be developed using historical data. The matrix should determine if there is a point in which there is opportunity to change sustainment strategy from CLS to organic without compromising the benefits gained from procuring CDA. The *Commercial Derivative Aircraft (CDA) Acquisition Guide* published in April 2011 provides a concept for matrix criteria and could be used as a baseline for establishing acquisition and sustainment policy.

**Establish an Equivalency Agreement with the FAA.** This only needs to be done if the AF chooses a sustainment strategy of requiring FAA certification of its contractors. Today, there is a Catch 22 situation. SAF directed ALCs to seek FAA certification. The FAA, as part of the Department of Transportation, has no authority over public use (in this case, military) aircraft. The FAA maintains that the AF's own contractual requirements are driving the need for certification, not the FAA. This is correct. A Bilateral Aviation Safety Agreement (BASA) exists between the FAA and some European nations. The requirements for a BASA are: the country must demonstrate a need for the agreement and the country must have an independent and technically competent aviation authority. An agreement of this type between the AF and the FAA would possibly resolve AF contractual issues. In theory, the AF already meets the criteria of establishing a need and having its own technically competent aviation authority. Unfortunately, the FAA has been given authority to negotiate agreements with other countries by the State Department, but has no authority to negotiate a similar agreement within the U.S. government. This recommendation needs to be pursued by SAF. Attempts to push similar agreements via MOAs at the ALC level have proven unsuccessful.

**Develop CDA CLS Specific Training.** As of October 2011, acquisition training only briefly touches on the intricacies of CDA CLS. While FAA certification procedures and military airworthiness training is available, research did not reveal in-depth training specific to life-cycle issues of sustaining CDA.

**Establish Core Source Selection Teams.** As demonstrated in the E-9 case analysis, staffing a source selection team every five years is problematic. Core source selection teams would alleviate the problem. These positions should be staffed with personnel who have years of acquisition experience. They should be permanent positions, but should be staffed by personnel on a rotating basis. The program team entering into source selection should still be required to fill at least one position on the PCAG team and one position on the technical team to provide advice on program specific criteria.

## **Conclusion**

The KC-10, T-1A and E9 cases studies showed there are many opportunities for improvement across the Air Force in relation to CDA CLS. Two of the recommendations noted above are easily obtainable and would provide the best return on investment: establishing an office of CDA experts and development of CDA CLS training since policy organizational policy changes made in a vacuum appear to have the most detrimental effects on sustainment of CDA. There is an immediate need for oversight of policy changes effecting CDA CLS in the Air Force. The other recommendations will require not only AF-level policy changes, but also congressional level changes that would not be easily implemented. Regardless, these changes could be championed by the recommended CDA program management office staffed by subject



matter experts knowledgeable on the long-term effects of disconnects between AF and FAA policies and congressional requirements in relation to CDA CLS.

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<sup>1</sup> Milt Ross. *Industry Perspective for the Commercial Derivative Aircraft Guidebook Appendix F*. (Dayton Aerospace, Inc., 31 January 2010), 8

<sup>2</sup> *Commercial Derivative Aircraft (CDA) Acquisition Guide*, November 2009, p5

<sup>3</sup> Air Force Aircraft Factsheets, <http://www.af.mil/information/factsheets/index.asp> (accessed 15 September 2011)

<sup>4</sup> *Commercial Derivative Aircraft (CDA) Acquisition Guide*, November 2009, 8

<sup>5</sup> *Commercial Derivative Aircraft (CDA) Acquisition Guide*, 2009, 7

<sup>6</sup> Ibid.

<sup>7</sup> *CLS Sustainment Division (GKS) Orientation Briefing*. Powerpoint Briefing. P:\727 ACSG\727 ACSG CXEA\Briefings\Orientation Briefing\Jul 11. (accessed 17 September 2011).

<sup>8</sup> *727 ACSG Contracts v2, Jan 11*. Excel Spreadsheet. P:\727 ACSG\727 ACSG CXEA\Contracts\GKS Contracts\Archive (accessed 19 September 2011)

<sup>9</sup> Air Force Policy Directive (AFPD) 62-6, *USAF Airworthiness*, 11 June 2010, 3

<sup>10</sup> Dr. William Stockman, Milt Ross, Robert Bongiovi, and Greg Sparks, *Successful Integration of Commercial Systems*. PDF Version Received via email From Robert Bongiovi To Kristi Leinneweber 15 August 2011. Publisher not noted. File dated June, 2011, 5

<sup>11</sup> Ibid, 23

<sup>12</sup> University of Kansas, *FAA Certification Procedures and Airworthiness Requirements as Applied to Military Procurement of Commercial Derivative Aircraft/Systems*, August 23-25 2011, 15

<sup>13</sup> William J. Perry, Secretary of Defense, to Secretaries of Military Departments, Chairman of the Joint Chiefs of Staff, Under Secretaries of Defense, Comptroller, Assistant Secretary of Defense, General Counsel, Inspector General, Director of Operational Test and Evaluation, Directors of the Defense Agencies, and Commander-in-Chief, Special Operations Command, Memorandum, 29 June 1994.

<sup>14</sup> Ibid

<sup>15</sup> Air Force Policy Directive (AFPD) 62-6, *USAF Airworthiness*, 11 June 2010, 3

<sup>16</sup> Ibid

<sup>17</sup> Stockman, *Successful Integration of Commercial Systems*, 25

<sup>18</sup> Ibid

<sup>19</sup> Ibid

<sup>20</sup> *Contractor Logistics Support in the U.S. Air Force*, RAND Project Air Force, 2009, 57

<sup>21</sup> Ibid, 59

<sup>22</sup> Ibid.

<sup>23</sup> Blaise J. Durante, Mark D. Johnson, and Debra K. Walker Assistant Secretary of the Air Force. To HQ AFMC/A4, OC-ALC/CL, OO-ALC/CC, WR-ALC/CC, ASC/CV, ESC/CV, and SMC/CC. Memorandum, Feb 05 2007.

<sup>24</sup> Ibid.

<sup>25</sup> James J. Ballough, J. Flight Standards Service, AFS-1. To All Regional Flight Standards Division Managers. Memorandum, Oct 10 2007.

<sup>26</sup> *Limitations on the performance of Depot-level Maintenance of Material*, 10 U.S.C. §2466, [http://www.law.cornell.edu/uscode/html/uscode10/uscode10\\_usc\\_sec\\_10\\_00002466](http://www.law.cornell.edu/uscode/html/uscode10/uscode10_usc_sec_10_00002466) (accessed 27 September 2011)

<sup>27</sup> *Definition of Depot-level Maintenance and Repair*, 10 U.S.C. §2460, [http://www.law.cornell.edu/uscode/html/uscode10/uscode10\\_usc\\_sec\\_10\\_00002460](http://www.law.cornell.edu/uscode/html/uscode10/uscode10_usc_sec_10_00002460) (accessed 27 September 2011)

<sup>28</sup> Thomas E. Stuckey, Manager, Flight Standards Division Southwest Region, To Robert J. Conner, Oklahoma City Air Logistics Center. Letter, 03 July 2007

<sup>29</sup> AFPD 62-6, Ibid, 3

<sup>30</sup> *ACSG Stats October 2011*, Excel Spreadsheet, P:\727 ACSG\727 ACSG CXEA\LK Stats (accessed 11 October 2011)



<sup>31</sup> HQ AFMC/PK To OC-ALC/PK (and all AFMC Contracting Organizations).Policy Memorandum 2009-PK-002, 09 February 2009

<sup>32</sup> Ibid

<sup>33</sup> AFPD 62-6, Ibid, 3



## Bibliography

Air Force Aircraft Factsheets, <http://www.af.mil/information/factsheets/index.asp> (accessed 15 September 2011)

Air Force Policy Directive (AFPD) 62-6, *USAF Airworthiness*, 11 June 2010

*ACSG Stats October 2011*, Excel Spreadsheet, P:\727 ACSG\727 ACSG CXEA\LK Stats (accessed 11 October 2011)

Ballough, James J. Flight Standards Service, AFS-1. To All Regional Flight Standards Division Managers. Memorandum, Oct 10 2007

*CLS Sustainment Division (GKS) Orientation Briefing*. Powerpoint Briefing. P:\727 ACSG\727 ACSG CXEA\Briefings\Orientation Briefing\Jul 11. (accessed 17 September 2011).

*Commercial Derivative Aircraft (CDA) Acquisition Guide*, November 2009.

*Contractor Logistics Support in the U.S. Air Force*. RAND Project Air Force, RAND Corporation, 2009. <http://www.rand.org>

*Definition of Depot-level Maintenance and Repair*, 10 U.S.C. §2460, [http://www.law.cornell.edu/uscode/html/uscode10/usc\\_sec\\_10\\_00002460](http://www.law.cornell.edu/uscode/html/uscode10/usc_sec_10_00002460) (accessed 27 September 2011)

Durante, Blaise J., Mark D. Johnson, and Debra K. Walker Assistant Secretary of the Air Force. To HQ AFMC/A4, OC-ALC/CL, OO-ALC/CC, WR-ALC/CC, ASC/CV, ESC/CV, and SMC/CC. Memorandum, 05 February 2007.

HQ AFMC/PK To OC-ALC/PK (and all AFMC Contracting Organizations).Policy Memorandum 2009-PK-002, 09 February 2009

*Limitations on the Performance of Depot-level Maintenance of Material*, 10 U.S.C. §2466, [http://www.law.cornell.edu/uscode/html/uscode10/usc\\_sec\\_10\\_00002466](http://www.law.cornell.edu/uscode/html/uscode10/usc_sec_10_00002466) (accessed 27 September 2011)

Perry, William J., Secretary of Defense, to Secretaries of Military Departments, Chairman of the Joint Chiefs of Staff, Under Secretaries of Defense, Comptroller, Assistant Secretary of Defense, General Counsel, Inspector General, Director of Operational Test and Evaluation, Directors of the Defense Agencies, and Commander-in-Chief, Special Operations Command. Memorandum, 29 June 1994.

Ross, Milt. "Industry Perspective for the Commercial Derivative Aircraft Guidebook, Appendix F." Dayton Aerospace, Inc., 31 January 2010.

Stockman, Dr. William, Milt Ross, Robert Bongiovi, and Greg Sparks, *Successful Integration of Commercial Systems*. PDF Version Received via email From Robert Bongiovi To Kristi Leinneweber 15 August 2011. Publisher not noted. File dated June, 2011.

Stuckey, Thomas E, Manager, Flight Standards Division Southwest Region, To Robert J. Conner, Oklahoma City Air Logistics Center. Letter, 03 July 2007

University of Kansas Student Manual, *FAA Certification Procedures and Airworthiness Requirements as Applied to Military Procurement of Commercial Derivative Aircraft/Systems*, 23-25 August 2011.

727 ACSG Contracts v2, Jan 11. Excel Spreadsheet. P:\727 ACSG\727 ACSG CXEA\Contracts\GKS Contracts\Archive (accessed 19 September 2011)

